# CHANGES TO *POTENTILLA RUBRICAULIS* S.L., *P. HOOKERIANA* (ROSACEAE), AND ERSTWHILE SYNONYMS IN *FLORA OF NORTH AMERICA NORTH OF MEXICO*


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## ABSTRACT

An expanded discussion of the *Potentilla rubricaulis* complex is provided to complement the synoptic treatment in pending volume 9 of *Flora of North America North of Mexico* (FNANM). Most elements previously included in a broadly defined *P. rubricaulis* are now divided among seven subarctic and alpine species (*P. rubricaulis* s.s., *P. hookeriana, P. furcata, P. modesta, P. pseudosericea, P. paucijuga, P. saximontana*) and two arctic species (*P. uschakovii, P. pedersenii*). Arctic and subarctic plants previously included in *P. hookeriana* are now treated as *P. arenosa*. Additional minor or unresolved arctic elements that will not be given full treatment in FNANM include *P. borealis, P. murrayi, P. petrovskyi, P. psychrophila, P. lyngei* subsp. *spissa, P. insularis*, and *P. arctoalaskensis*, with *P. tolmatchevii, P. dezhnevii, P. tschaunensis*, and *P. safronoviae* as probable synonyms. The names *P. nivea* var. *pentaphylla* and *P. quinquefolia* do not apply to North American plants. The lectotype of *P. nivea* var. *subquinata* is interpreted as the hybrid of *P. nivea* and *P. arenosa*. The lectotype institution is designated for *Potentilla saximontana* Rydb.



Key Words: *Potentilla rubricaulis*, *Potentilla hookeriana*, *Potentilla* nomenclature, *Flora of North America North of Mexico*



## RESUMEN

Se adopta una discusión extensa del complejo *Potentilla rubricaulis* para complementar el tratamiento sinóptico en el volumen 9 de la *Flora of North America North of Mexico* (FNANM). La mayoría de los elementos Incluidos previamente en una *P. rubricaulis* definida ampliamente se dividen ahora en siete especies subárticas y alpinas (*P. rubricaulis* s.s., *P. hookeriana, P. furcata, P. modesta, P. pseudosericea, P. paucijuga, P. saximontana*) y dos especies árticas (*P. uschakovii, P. pedersenii*). Las plantas árticas y subárticas incluidas previamente en *P. hookeriana* se tratan ahora como *P. arenosa*. Los elementos árticos adicionales menores o no resueltos a los que no se les dará un tratamiento completo en la FNANM incluyen *P. borealis, P. murrayi, P. petrovskyi, P. psychrophila, P. lyngei* subsp. *spissa, P. insularis*, y *P. arctoalaskensis*, con *P. tolmatchevii, P. dezhnevii, P. tschaunensis*, y *P. safronoviae* como sinónimos probables. Los nombres *P. nivea* var. *pentaphylla* y *P. quinquefolia* no se aplican a plantas Norte Americanas. El lectotipo de *P. nivea* var. *subquinata* se interpreta como el híbrido de *P. nivea P. arenosa*. Se designa la institución del lectotipo para *Potentilla saximontana* Rydb.


## NOMENCLATURAL BACKGROUND OF THE *POTENTILLA RUBRICAULIS* COMPLEX

Preparation of the first continent-wide treatment of *Potentilla* (Rosaceae) for North America since that of Rydberg (1908) required a full-scale revisionary effort to synthesize differing taxonomic concepts among regional and international floras. In particularly complex situations, the discussion that was needed to explain and justify the resultant changes was well beyond the scope of a synoptic flora. This was particularly true for the *P. rubricaulis* complex, which is accordingly published here instead.

Regional floristic works in the last century (e.g., Polunin 1940; Porsild 1957; Hultén 1968; Porsild & Cody 1980; Welsh et al. 1993; Weber & Wittman 1996; Holmgren 1997) have generally used the name *Potentilla rubricaulis* Lehm. in a broad and often conflicting manner, for plants with at least some palmate to subpalmate (vs. strictly ternate) leaves and short styles (less than 1.5 mm) that are usually thickened and glandular-papillate basally. Alternatives have included the segregation of some elements as the ambiguous *P. quinquefolia* Rydb. (e.g., Hitchcock & Cronquist 1961; Boivin 1967; Dorn 1977) or the inclusion of *P. rubricaulis* in *P. pulchella* R. Br. (Scoggan 1978). As further confusion, Soják (1986, 1994) added *P. hookeriana* Lehm., a name previously used for a widespread species in the *P. nivea* L. complex, to the synonymy of *P. rubricaulis* s.l.

Although some of our early annotations and treatments (e.g., Elven & Aiken 2007) also reflect an inclusive *Potentilla rubricaulis*, we now conclude that several reasonably distinct species can be parsed, based on our combined studies of a broad range of material from the Arctic to the southern Rocky Mountains, increased attention to vestiture and inflorescence architecture, and new analyses of types, including some lectotypifications (Ertter 2008; Soják 1986). Most of these species collectively comprise *Potentilla* sect. *Rubricaules* (Rydb.) A. Nelson, used by us as a category of convenience for independently propagating species that purportedly originated as intersectional hybrids between members of ternate-leaved sect. *Niveae* (Rydb.) A. Nelson and pinnate- to subpalmate-leaved sect. *Pensylvanicae* Poeverl. Soják (1986) considered at least 30 species, mostly Eurasian, to be such intersectional hybrids. Jurtzev (1984) and Soják (1986) have treated the Eurasian variation in this group in detail; Soják's work also dealt with Greenland and North American species. He initially (1986) accepted several distinct North American species in the complex, but later (1994) reverted to an inclusive *P. rubricaulis* for non-arctic members of the section.

Listed below are the species comprising sect. *Rubricaules* in the pending volume 9 of *Flora of North America North of Mexico* (FNANM), plus additional taxa that have been included in *Potentilla rubricaulis* s.l., with full discussion and type paragraphs. Descriptions, keys, and distributions can be found in the pending FNANM treatment. Interpretations of probable parentage, mostly by Soják, are provided only for arctic and subarctic species. Problematic or minor elements not given full treatment in FNANM are also addressed, as are other erstwhile synonyms of *P. rubricaulis* s.l. Additional information and discussion on arctic species is available at the Panarctic Flora website (http://nhm2.uio.no/paf/).

## SUBARCTIC AND TEMPERATE SPECIES IN FNANM

Outside of the Arctic, seven species previously included in *Potentilla rubricaulis* s.l. are being treated as distinct species in FNANM. These are only the best-defined elements morphologically and geographically, occurring primarily in the Rocky Mountains and subarctic regions of Alaska and western Canada. Further investigation is needed to resolve numerous poorly understood variants and transition zones, especially in western Canada. For example, plants from the northern prairies of Saskatchewan, Alberta, and Montana evidently represent an undescribed taxon, and collections from some other areas (e.g., Hoback Canyon, Wyoming; Schell Peak, Nevada) are also under investigation as possible novelties.

**Potentilla rubricaulis** Lehm., Nov. Stirp. Pug. 2:11. 1830. *Potentilla dissecta* Pursh var. *rubricaulis* (Lehm.) Rydb., Bull. Torrey Bot Club 23:396. 1896; *Potentilla nivea* L. subsp. *rubricaulis* (Lehm.) Hiitonen, Arch. Soc. Zool. Bot. Fenn. "Vanamo" 2:25. 1947[1949]. TYPE: CANADA: NORTHWEST TERRITORIES: "about [Great] Bear Lake, in lat. 66°" (not provided in protologue, but given by Lehm. in Fl. Bor.-Amer. (Hooker) 1:191. 1832), *Richardson s.n.* (LECTOTYPE, designated by Soják, Bot. Jahrb. Syst. 106:181. 1986: PR; ISOLECTOTYPES: BM, DR, E, K).

The narrow circumscription of *Potentilla rubricaulis* is restricted to relatively large plants with open inflorescences occurring mainly in glaciated parts of subarctic northwestern Canada and southern Alaska. Soják (1986) initially interpreted *P. rubricaulis* (including *P. furcata* A.E. Porsild) as the hybrid species originating from *P. arenosa* (Turcz.) Juz. (sect. *Niveae*) × *P. bimundorum* Soják (sect. *Pensylvanicae*), but later (1994) concluded that *P. litoralis* Rydb. was the more likely sect. *Pensylvanicae* parent for a broadly defined *P. rubricaulis*. The distinction between *P. rubricaulis* and large forms of *P. arenosa* with supernumerary leaflets is problematic, though the latter tends to have more stiffly spreading petiole hairs and prominently petiolulate central leaflets.

Shared with *P. bimundorum* are subappressed stem and petiole hairs, sparse glands, strongly revolute leaf margins, and raised, partly reticulate veins on epicalyx bractlets and sepals. The range of *P. rubricaulis* is largely within the glaciated area of overlap between *P. arenosa* and *P. bimundorum*, but the species is nearly absent from the unglaciated Beringian parts of Alaska and the Yukon Territory, even where the two presumed parents are both common.

**Potentilla hookeriana** Lehm., Del. Sem. Hort. Bot. Hamburg. 1849:10. 1849. *Potentilla nivea* L. var. *hookeriana* (Lehm.) Th. Wolf, Biblioth. Bot. 16(Heft 71):240. 1908; *Potentilla nivea L.* subsp. *hookeriana* (Lehm.) Hiitonen, Arch. Soc. Zool. Bot. Fenn. "Vanamo" 2:25. 1947 [1949]. TYPE: "America septententrionali" (probably CANADA): east side Rocky Mountains (possibly near Jasper House), *Burke s.n.* (LECTOTYPE, designated by Soják (as holotype), Bot. Jahrb. Syst. 106:201. 1986: PR; ISOLECTOTYPE: K).

The name *Potentilla hookeriana*, or its infraspecific equivalent under *P. nivea*, has traditionally been applied to a widespread primarily ternate-leaved member of sect. *Niveae*. As noted by Soják (1986), however, the type has at least some 5-foliate leaves, as do most other populations outside of the Arctic. As a result, the ternate-leaved arctic and subarctic material that was previously known as *P. hookeriana* has now taken *P. arenosa* (Turcz.) Juz. as the next available name. This occurred after a brief period when it was called *P. nivea* s.s. (e.g., Soják 1989; Cody 1996) until that name was conserved with a conserved type (Eriksen et. al. 1999), thereby maintaining *P. nivea* in its traditional sense for a separate species.

The name *Potentilla hookeriana* is retained by us but in a restricted sense, applied to mostly alpine plants from the Rocky Mountains and eastern Great Basin. In addition to encompassing most of traditional *P. hookeriana* from this area, our new circumscription also includes many 5-foliate collections previously identified as *P. rubricaulis*.

**Potentilla furcata** A.E. Porsild, Bull. Natl. Mus. Canada 121:224. 1951. *Potentilla hookeriana* Lehm. var. *furcata* (A.E. Porsild) Hultén, Ark. Bot. (n.s.) 7:72. 1968; *Potentilla rubricaulis* Lehm. var. *furcata* (A.E. Porsild) Soják, Bot. Jahrb. Syst. 106:209. 1986. TYPE: CANADA. YUKON TERRITORY: Canol Road, Rose-Lapie R. Pass near Mile 102, 19 Jul 1944, *Porsild & Breitung 10625* (HOLOTYPE: CAN; ISOTYPES: GH, UC, US).

Although included within *Potentilla rubricaulis* by Soják (1986, 1994), in our interpretation *P. furcata* differs in several characters that suggest a hybrid origin from *P. arenosa* and a glandular member of the *P. pensylvanica* L. complex. It is a characteristic species of the steppe bluffs of interior and south-central Alaska, Yukon Territory, and northern British Columbia, mainly within the unglaciated Beringian region (i.e., largely allopatric to *P. rubricaulis* s.s.).

**Potentilla modesta** Rydb., N. Amer. Fl. 22:331. 1908. *Potentilla concinna* Richardson var. *modesta* (Rydb.) S.L. Welsh & B.C. Johnst., Great Basin Naturalist 45:25. 1982. TYPE: U.S.A. UTAH. Piute Co.: Mt. Barette, Tushar Mts., 26 Jul 1905, *Rydberg & Carlton 7261* (HOLOTYPE: NY; ISOTYPE: UC).

*Potentilla modesta* is the dominant component of *P. rubricaulis* s.l. in the Intermountain Region (e.g., Holmgren 1997, including illustration). Plants generally have more consistently 5-foliate leaves and more congested inflorescences than *P. hookeriana*. Soják (1994) and Holmgren (1997) considered *P. modesta* to be a synonym of *P. rubricaulis* s.l., while Hultén (1945) included *P. modesta* in the synonymy of his primarily arctic concept of *P. nivea* subsp. *subquinata* (Lange) Hultén. The epithet *modesta* is misapplied in Welsh et al. (1993), where the combination *P. concinna* Richardson var. *modesta* (Rydb.) S.L. Welsh & B.C. Johnst. is used for long-styled plants placed by us in *P. concinna* var. *divisa* Rydb. (sect. *Concinnae* (Rydb.) A. Nelson).

**Potentilla pseudosericea** Rydb., Mem. Dept. Bot. Columbia Coll. 2:98. 1898. TYPE: U.S.A. "NEVADA. Esmeralda Co.:" [actually California, Mono Co.], White Mountains, 19 Aug 1888, *Shockley 592* (LECTOTYPE, designated by Ertter, J. Bot. Res. Inst. Texas 2:204. 2008: GH; ISOLECTOTYPES: GH, JEPS, UC).

As discussed elsewhere (Ertter 2008), the traditional use of *Potentilla pseudosericea* for plants endemic to the White Mountains on the border of California and Nevada was at odds with Rydberg's (1908) citation of "Rocky Mountains" as type locality. This citation resulted from the fact that two of the three syntypes were from the Rocky Mountains, both now identified as *P. bipinnatifida* Douglas ex Hook. in sect. *Pensylvanicae*. The traditional application has been preserved by lectotypification on the third syntype, purportedly from Nevada but

actually from California (Ertter 2008). Whether the species occurs in Nevada remains to be determined. Soják (1994) included *P. pseudosericea* within *P. rubricaulis* s.l.

**Potentilla paucijuga** Rydb., N. Amer. Fl. 22:348. 1908. *Potentilla pensylvanica* L. var. *paucijuga* (Rydb.) C. L. Welsh & B. C. Johnst., Great Basin Naturalist 42:31. 1982; *Potentilla rubricaulis* Lehm. var. *paucijuga* (Rydb.) Soják, Thaiszia 16:49. 2006. TYPE: U.S.A. UTAH: La Sal Mts., *Purpus 251 p.p.* (HOLOTYPE: US; ISOTYPE (fragment): NY).

*Potentilla paucijuga*, treated by us as endemic to the La Sal Mountains of Utah, was included in the synonymy of *P. rubricaulis* s.l. by Soják (1994) and Holmgren (1997). Plants have subpalmate leaves, with somewhat larger flowers and longer styles than sympatric members of sect. *Rubricaules*. In Colorado (e.g., Weber & Wittman 1996), the combination *P. pensylvanica* var. *paucijuga* (Rydb.) S.L. Welsh & B.C. Johnston has been misapplied to what is treated by us as *P. jepsonii* Ertter (sect. *Pensylvanicae*).

**Potentilla saximontana** Rydb., Bull. Torrey Bot. Club 23:399. 1896. *Potentilla rubripes* var. *saximontana* (Rydb.) Th. Wolf, Biblioth. Bot. 16 (Heft 71):205. 1908. TYPE: U.S.A. COLORADO: Wheeler's Exped., 1873, *Wolfe & Rothrock 366* (LECTOTYPE, designated here: GH; ISOLECTOTYPES: NY, US).

? *Potentilla nivea* L. var. *dissecta* S. Watson, Proc. Amer. Acad. Arts 8:559. 1873, not *Potentilla dissecta* Pursh; *Potentilla saximontana* Rydb. var. *dissecta* (S. Watson) Soják, Thaiszia 16:49. 2006. TYPE: CANADA: "Rocky Mountains of British America," *Drummond 368* (LECTOTYPE, designated by Ertter, J. Bot. Res. Inst. Texas 2:204. 2008: NY).

?*Potentilla pseudosericea* Rydb. var. *grandiflora* Th. Wolf, Biblioth. Bot. 16(Heft 71):153. 1908. TYPE: probably CANADA: Rocky Mountains, *Drummond s.n.* (LECTOTYPE, designated by Ertter (as holotype), Brittonia 44:432. 1992: DR; ISOLECTOTYPE: K).

Although often included in *Potentilla rubricaulis* s.l. (e.g., Holmgren 1997; Weber & Wittman 1996), *P. saximontana* differs in having subpinnate leaves and smooth columnar styles. It is accordingly placed by us in sect. *Subjugae* (Rydb.) A. Nelson rather than sect. *Rubricaules*, with many collections being transitional to *P. subjuga* Rydb. The species is restricted to high elevations in the mountains of Colorado, Montana, Utah, and Wyoming. Lectotypification of *P. saximontana*, provided above, is required only because a specific institution was not indicated in the protologue. Otherwise the GH specimen could be accepted as holotype, as the only known duplicate annotated with this name by Rydberg.

The lectotype of *Potentilla nivea* var. *dissecta* S. Watson has been tentatively included in *P. saximontana* (Ertter 2008), but *P. saximontana* is not otherwise known from the Canadian Rockies. The name *P. pseudosericea* var. *grandiflora* Th. Wolf, misapplied by Jepson (1936) to what is now called *P. morefieldii* Ertter, probably represents the same entity, and possibly the same *Drummond* collection.

Although references to Hooker's herbarium in the protologue might suggest that the type of *Potentilla pseudosericea* var. *grandiflora* is at Kew, Wolf (1908) is clearly referring to the specimen in his own herbarium, now at DR, which is annotated with this name and "NW Amerika/(ex herb. Hooker)/Lag mit echter P. diversifolia Lehm. zusammen". The corresponding sheet in Hooker's herbarium has a only a single specimen matching the DR specimen of *P. pseudosericea* var. *grandiflora* (K000762566), mounted with two large plants of *P. glaucophylla* Lehm. (formerly *P. diversifolia* Lehm.). This sheet provides the additional collecting information of "Rocky Mt/Drummond". A specimen in the Bentham herbarium (K000762567) is probably a duplicate, in spite of Hooker being the only person's name on the label.

## ARCTIC SPECIES IN FNANM

Treatment of arctic variation in sect. *Rubricaules* is even more problematic than in temperate and subarctic areas, complicated by the challenge of applying the plethora of names based primarily on Eurasian types in a region with limited access and a complex post-glacial biogeography. At present, we find only two arctic components of sect. *Rubricaules* sufficiently uniform and widespread in North America to merit full treatment in FNANM: *Potentilla pedersenii* (Rydb.) Rydb. and a species to which we provisionally apply the name *P. uschakovii* Jurtzev. These two species constitute the major portion of what has been called *P. rubricaulis* in arctic Canada and Greenland (e.g., Porsild 1957; Hultén 1968; Böcher et al. 1978; Porsild & Cody 1980; Hultén & Fries 1986). The diagnostic morphological characters can be variable and overlapping, but the two species are nevertheless treated separately in part because of differences in putative parental combinations.

**Potentilla uschakovii** Jurtzev, Bot. Zhurn. (Moscow & Leningrad) 73:1613. 1988. TYPE: RUSSIA: Wrangel Island, "ad fontes fl. Somnitelnaja, 11 km ab ostio," 27 Jul 1986, *Jurtzev s.n.* (HOLOTYPE: LE).

*Potentilla uschakovii* was described by Jurtzev (1988) as endemic to Wrangel Island, the only place in Asia where the putative parents (*P. subvahliana* Jurtzev [sect. *Niveae*] and *P. pulchella* [sect. *Pensylvanicae*]) are sympatric. The original description deviates in major features from the arctic Canadian and Greenland plants to which we apply this name, not least in regularly ternate leaves. Our expanded use of the name is based solely on the interpretation of the same hybrid parentage, since *P. subvahliana* and *P. pulchella* are the only representatives of their groups within the American range of plants that we treat as *P. uschakovii* in FNANM. Morphologic features of North American *P. uschakovii* that are suggestive of *P. pulchella* as one parent include more than three deeply dissected leaflets and leaflet teeth with soft well-developed apical hair tufts. Other features point toward *P. subvahliana* as the second parent: caudex branches with persistent whole leaves, smooth petiole hairs, and one- or few-flowered inflorescences with large flowers. There is much variation among the North American plants, such that each island or population may have its own features. It is therefore probable that the species has arisen from numerous hybridization events.

**Potentilla pedersenii** (Rydb.) Rydb., N. Amer. Fl. 22(4):332. 1908. *Potentilla subquinata* (Lange) Rydb. var. *pedersenii* Rydb., Bull. Torrey Bot. Club 28:182. 1901. TYPE: GREENLAND: Disko Island, Vaigut Assuk, 25 Jul 1898, Pedersen 470 (LECTOTYPE, designated by Soják, Bot. Jahrb. Syst. 106:190. 1986: NY; ISOLECTOTYPES: C, S).

*Potentilla tolmatchevii* Jurtzev & Soják, Arktichesk. Fl. SSSR 9(1):320. 1984. TYPE: RUSSIA. SIBERIA: "in cursu inferiore fl. Jenisei prope pagum Sopocznaja Karga," 12 Aug 1926, *Tolmatchev 447* (HOLOTYPE: LE).

Soják (1986) interpreted *Potentilla pedersenii* to have arisen from crosses between *P. arenosa* subsp. *arenosa* and *P. pulchella*. Features of *P. pedersenii* that indicate *P. arenosa* as the sect. *Niveae* parent include no marcescent whole leaves, verrucose petiole hairs, and inflorescences with more and mostly smaller flowers than *P. uschakovii*. Like *P. uschakovii*, the species is polymorphic and probably the result of multiple hybridizations. It has, however, a coherent range in arctic North American, including Greenland. Reports of *P. pedersenii* from northeastern European Russia may perhaps involve *P. arenosa* subsp. *chamissonis* (Hultén) Elven & D.F. Murray rather than subsp. *arenosa* as one hybrid parent.

Jurtzev and Soják (in Jurtzev 1984) described *Potentilla tolmatchevii* from northern Asia as a hybrid species from *P. arenosa* subsp. *arenosa* × *P. pulchella*. Material annotated by Jurtzev as *P. tolmatchevii* and numerous collections from Ellesmere Island fit the American concept of *P. pedersenii*. The two species are therefore merged by us under the priority name.

Since *Potentilla pedersenii* was introduced by Rydberg (1908) as a "sp. nov.," the name is often treated as a newly described species (e.g., Soják 1986). However, Rydberg's inclusion of *P. subquinata* var. *pedersenii* in synonymy establishes the varietal name as a basionym, making *P. pedersenii* a new combination (K. Gandhi, pers. comm. 2011).

## TAXA NOT GIVEN FULL TREATMENT IN FNANM

In addition to the preceding species being treated in FNANM, there are numerous local or scattered populations of *Potentilla* in the Arctic that combine characters from sect. *Niveae* and sect. *Pensylvanicae*, or that have otherwise been included in a broadly defined *P. rubricaulis*. Some of these may prove worthy of full taxonomic recognition as species of hybrid origin, as they propagate independently of their putative parents (probably mainly by agamospermy; cf. Eriksen 1996). Others are too different from place to place to deserve full species treatment, i.e., they are not fully stabilized or sufficiently widespread. The following such entities—named and adequately described as species—have been reported from arctic parts of North America and Greenland, but the evidence is insufficient for full treatment in FNANM.

**Potentilla borealis** Soják, Willdenowia 15:167. 1985. TYPE: RUSSIA: West Chukotka, "editum montanum Anyuyskoge, jugum Ilirniyskiy, systema lacus Tytyl," 19 Aug 1980, *Petrovsky 80-233* (HOLOTYPE: PR; ISOTYPE: LE).

Soják (1985) interpreted *Potentilla borealis* as the hybrid of *P. anachoretica* Soják (sect. *Pensylvanicae*) × *P. arenosa* subsp. *arenosa*. Reports by B.A. Jurtzev (in Elven & Aiken 2007) of this species from the Seward Peninsula (western Alaska) and Ogilvie Mountains (Yukon Territory) refer to plants with subpalmate to subpinnate leaves, very slender and silky hairy leaflet lobes, and many glands on the epicalyx bractlets and sepals. The last feature is not in accordance with the presumed parentage, so the identity of these North American plants as *P. borealis* remains to be confirmed.

**Potentilla dezhnevii** Jurtzev, Arktichesk. Fl. SSSR 9(1):318. 1984. TYPE: RUSSIA: EAST CHUKOTKA: "Peninsula Tschukotskij, ad ripam dextram fl. Putukunei-veem (affluentiae sinistrae fl. Czegitun)," 20 Jul 1972, *Jurtzev s.n.* (HOLOTYPE: LE).

**?Potentilla murrayi** Jurtzev, Bot. Zhurn. (Moscow & Leningrad) 78(11):80. 1993. TYPE: U.S.A. ALASKA: Brooks Range, Mount Hultén, Dalton Hwy, 68°27'N 149°18'W, 2 Aug 1986, *Murray 9011* (HOLOTYPE: ALA).

Jurtzev (1993) interpreted *Potentilla murrayi* as a hybrid species from *P. anachoretica* and *P. subvahliana*. It is a distinct local entity, forming significant and morphologically consistent populations in a small part of the Brooks Range. The hybrid assumption is partly supported by morphology: leaf dissection and vestiture resemble *P. anachoretica*, whereas the influence from *P. subvahliana* is very evident in its columnar tussocks, leaves, and flowers. Reports of *P. murrayi* from outside the central Brooks Range are based on rather different plants, not forming a morphologically consistent entity. It is debatable whether *P. murrayi* is distinct from *P. dezhnevii* of the Russian Far East, since Soják (2004) suggested that both have the same parentage. If so, *P. dezhnevii* would be the priority name.

**Potentilla petrovskyi** Soják, Cas. Nár. Mus., Odd. Prir. 153(2):102. 1984. TYPE: RUSSIA: SOUTH CHUKOTKA: "Anadyr, r-n. ch. Pekulnej, r. Sev. Pekulnejveem," 1977, *Vassiljeva 77-212* (HOLOTYPE: LE; ISOTYPE: PR).

**Potentilla tschaunensis** Juz. ex Jurtzev, Arktichesk. Fl. SSSR 9(1):317. 1984. TYPE: RUSSIA: WEST CHUKOTKA: "districtus Czaunensis, regio ripae sinistrae fl. Olvegyrgy-vaam," 23 Jun 1951, *Schmorgunova s.n.* (HOLOTYPE: LE).

Both of these species, described from the Russian Far East, were interpreted by Soják (2004) as *Potentilla anachoretica* × *P. nivea* s.l.; he accordingly synonymized *P. tschauensis* under *P. petrovskyi*. Plants conforming to Jurtzev's description are present on the Seward Peninsula, western Alaska. However, in our evaluation these collections do not constitute a coherent taxon, but rather a gathering of scattered hybrid biotypes. Other reports from northwest North America are based on plants included by Soják in *P. psychrophila*.

**Potentilla psychrophila** Soják, Thaiszia 16:94. 2007 [2006]. TYPE: U.S.A. ALASKA: ne Brooks Range, Lake Peters area, Coke Creek drainage, 69°21'N 144°57'W, 29 Jun 1973, *Batten 250* (HOLOTYPE: ALA).

The major portions of what had been annotated as *Potentilla rubricaulis* and *P. petrovskyi* in Alaska and Yukon Territory were transferred by Soják (2007) to his new species *P. psychrophila*, which he assumed to be a hybrid species from *P. litoralis* and *P. nivea*. The material annotated by Soják is polymorphic and may contain the products of several hybridizations, perhaps among different species. At least one part is morphologically consistent and is known to represent fairly large populations in central and northern Alaska and in the Yukon Territory, but whether this is an acceptable hybrid species remains in question.

**Potentilla safronoviae** Jurtzev & Soják, Bot. Zhurn. (Moscow & Leningrad) 73:1615. 1988. TYPE: RUSSIA. SIBERIA: "(Jacutia Orientalis arctica), promontorium Svjatei Nos, 1 km ab statione polari Svjatoi Nos ad austro-austro-orientem," 16 Aug 1976, *Safronova 706* (HOLOTYPE: LE; ISOTYPE: PR).

**Potentilla lyngei** Jurtzev & Soják subsp. **spissa** Soják, Feddes Repert. 117:496. 2006. TYPE: GREENLAND: Wollaston Forland, Herschell, 1964, Rosenberg s.n. (HOLOTYPE: PR).

Soják (2006) described *Potentilla lyngei* subsp. *spissa* based on plants previously identified by Danish botanists as either *P. rubricaulis* or *P. pulchella*. This plant has a significant range and consistent morphology in northeast Greenland. It is accordingly a candidate for recognition as an independent taxon, but in our understanding not as a subspecies of *P. lyngei*. We agree with Sojak's treatment of *P. lyngei* subsp. *lyngei* (sect. *Pensylvanicae*) as a distinct taxon in north European Russia, with one close relative in the Russian Far East (*P. wrangelii* V.V. Petro-

vsky, Wrangel Island). However, in our interpretation, plants annotated by Soják as *P. lyngei* subsp. *spissa* (or an unpublished combination as a subspecies of *P. insularis*) are probably hybrids between *P. pulchella* and *P. hyparctica* Malte (sect. *Aureae* (Rydb.) Juz.). As such, *P. lyngei* subsp. *spissa* is a synonym of *P. safronoviae*, described from Siberia.

**Potentilla insularis** Soják, Bot. Jahrb. Syst. 106:203. 1986. TYPE: NORWAY: Svalbard, Spitsbergen, Hyperithatten, 28 Aug 1908, *Resvoll-Dieset s.n.* (HOLOTYPE: O).

*Potentilla insularis*, described from Svalbard and east Greenland, was interpreted by Soják (1986) as *P. arenosa* subsp. *chamissonis* × *P. lyngei* s.l. Soják believed *P. lyngei* subsp. *lyngei* to be the sect. *Pensylvanicae* parent of the Svalbard plants, but subsp. *spissa* (= *P. safronoviae*) to be the corresponding parent of the Greenland plants. The hybrid origin of *P. insularis* has been contested for morphological and molecular reasons (Hansen et al. 2000; Hamre 2000). The Svalbard *P. insularis*, however, has proved very close to Greenland *P. pedersenii* in gross morphology and to *P. arenosa* subsp. *chamissonis* in RAPD multilocus phenotypes (Hansen et al. 2000).

**Potentilla arctoalaskensis** Jurtzev, Bot. Zhurn. (Moscow & Leningrad) 78(11):79. 1993. TYPE: U.S.A. ALASKA: Seward Peninsula, 18.5 miles SW of Deering near Utica Creek, 65°53'N 163°5'W, 23 Jun 1978, *Wright 42* p.p. (HOLOTYPE: ALA).

*Potentilla arctoalaskensis* is evidently known only from the type, which Jurtzev (1993) interpreted as *P. arenosa* × *P. litoralis*. The type sheet is a mixed collection with an unnamed variant of *P. litoralis* that is the common form in Alaska. Typical *P. litoralis* barely enters Alaska from the southeast.

## EXCLUDED NAMES

**Potentilla nivea** L. var. **pentaphylla** Turcz., Bull. Soc. Imp. Naturalistes Moscou 16(4):607. 1843. *Potentilla nivea* [var.] *quinquefolia* Rydb., Bull. Torrey Bot. Club 23:302. 1896; *Potentilla quinquefolia* Rydb., Mem. Dept. Bot. Columbia Coll. 2:76. 1898. TYPE: RUSSIA. SIBERIA: "ad fl. Okam," *Kuznetsov s.n.* (HOLOTYPE: proabably LE).

**Potentilla nivea** L. [var.] **subquinata** Lange, Meddel. Gronland 3:9. 1880. *Potentilla subquinata* (Lange) Rydb., Bull. Torrey Bot. Club 28:181. 1901; *Potentilla nivea* L. subsp. *subquinata* (Lange) Hultén, Bot. Not. 1945:135. 1945. TYPE: GREENLAND: Disko Island, Quannersuit, 23 Jun 1871, *Fries s.n.* (LECTOTYPE, designated by J. Soják, Bot. Jahrb. Syst. 106:198. 1986: C).

Among the other names that have been used for American members of sect. *Rubricaules* are *Potentilla nivea* var. *pentaphylla* "Lehm." and its substitute name *P. quinquefolia* Rydb. Soják (1986), for example, included both names in his synonymy of *P. hookeriana* and designated a lectotype at PR, based on a specimen from the Hooker herbarium from "America septentr." This interpretation results from the traditional attribution of *P. nivea* var. *pentaphylla* to Lehmann (Del. Sem. Hort. Hamburg. 1850:12. 1850), sometimes with reference to an earlier publication (Lehmann in Fl. Bor-Amer. (Hooker) 1:195. 1832). The earlier publication includes a description but lacks the actual combination, and by the time of the later publication the combination had already been validly published by Turczaninow. Lehmann's putative combination is therefore at best an isonym of *P. nivea* var. *pentaphylla* Turcz., as accepted by Wolf (1908). By current taxonomy (e.g., Juzepczuk 1941; Soják, pers. comm., 2011), Turczaninow's type is a variant of *P. altaica* Bunge, endemic to central Asia. Neither the name *P. nivea* var. *pentaphylla* nor *P. quinquefolia* therefore has any application in North America. As an alternative interpretation, Porsild (1951) called *P. quinquefolia* a *nomen confusum* to be discarded.

Another commonly used name, *Potentilla nivea* var. *subquinata* Lange (= *P. subquinata* (Lange) Rydb.), has generally been considered a heterotypic synonym of the preceding names (e.g., Rydberg 1908, Hultén 1945). However, we interpret the lectotype designated by Soják (1986) as the casual hybrid of *P. nivea* and *P. arenosa* that is common throughout the sympatric ranges of these species, for which *P. prostrata* Rottb. is the priority name. Since both of the putative parents are in sect. *Niveae*, the epithet *subquinata* is not applicable to any member of sect. *Rubricaules*. Normally trifoliolate species in sect. *Niveae* will occasionally produce supernumerary leaflets, especially under favorable conditions (Eriksen & Nyléhn 1999).

## ACKNOWLEDGMENTS

We gratefully take this opportunity to dedicate this article and the pending treatment of *Potentilla* in FNANM

to the late Boris A. Yurtzev/Jurtzev (1932–2004; LE) and Jiři Soják (1936–2012; PR), whose joint expertise was critical to synthesizing the previously independent taxonomic traditions in American and Eurasian *Potentilla*. Without the results of their decades of studies on *Potentilla* worldwide, and their generous willingness to work collaboratively with us, the FNANM treatment would be seriously deficient. This has been particularly true for circumarctic taxa, which have been extensively revised as a result of recent trans-Beringian and trans-Atlantic analyses.

We are likewise indebted to Bente Eriksen, Mats Töpel, and Christoph Dobeš for sharing both their friendship and their latest research on the molecular phylogeny of *Potentilla*. A comparable debt for assistance in resolving nomenclatural quandaries is owed to Kanchi Gandhi, James L. Reveal, John McNeill, and Dick Brummitt. We are most grateful to Arnold Tiehm (RENO) and an anonymous reviewer for detailed reviews and comments on an earlier draft.

Support to the senior author from the Lawrence R. Heckard Endowment Fund of the Jepson Herbarium is gratefully acknowledged, as is the University of California Botanical Garden for the maintenance of living collections. The University and Jepson Herbaria at the University of California at Berkeley, the Natural History Museums of the University of Oslo, the University of Alaska Museum of the North, the Snake River Plains Herbarium at Boise State University, the Missouri Botanical Garden, and the National Museum in Prague Herbarium are to be thanked for use of facilities and staff support, as are ALTA, ARIZ, BRY, CAN, COLO, DAO, DR, GH, K, MONTU, NY, OSC, RM, US, UTC, and WTU for providing loans used in this research.

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